NIMBioS
National Institute for Mathematical and Biological Synthesis

NIMBioS Interdisciplinary Seminar

Dr. Rob de Boer
Theoretical Biology and Bioinformatics
Utrecht University

3:30 p.m.*, April 30, 2012
NIMBioS, Claxton Education Bldg, 1122 Volunteer Blvd, Rm 206

"Analysing immune cell migration"

The visualization of the dynamic behaviour of and interactions between immune cells using time-lapse video microscopy has an important role in modern immunology. To draw robust conclusions, quantification of such cell migration is required. This is far from trivial because imaging experiments are associated with various artefacts that can affect the estimated positions of the immune cells under analysis, which form the basis of any subsequent analysis. We construct spatially explicit models of T cell and DC migration in LNs and show that several dynamical properties of T cells are a consequence of the densely packed LN environment. Our three-dimensional simulations suggest that the initial decrease in T-cell motility after antigen appearance is due to "stop signals" transmitted by activated DCs to T cells. Because imaging is typically restricted to experiments lasting 1 h, and because T cell-DC conjugates frequently move into and out of the imaged volume, it is difficult to estimate the true duration of interactions from contact data. We propose a method to properly make such an estimate of the average of the contact durations. The method is validated by testing it to our spatially explicit computer simulations. We use these techniques to analyze the migration of antigen specific CD8 T cells in the skin after localized infection with herpes simplex virus.

**Join us for refreshments at 3 p.m.*

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